

TECHNICAL NOTES

U. S. DEPARTMENT OF AGRICULTURE SOUTH DAKOTA SOIL CONSERVATION SERVICE

Woodland No. 26

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Living Snowfence

"In recent years, the planting of trees and shrubs along highways has received considerable attention. The main reason, of course, has been beautification, but in some instances this has been combined with snowdrift control in a dual purpose planting.

Much literature is available on the planting of trees and shrubs for shelterbelt purposes to protect farmsteads, minimize snow drifting against farm buildings or into feedlots, to protect crops, and to reduce wind erosion on agricultural fields. Information dealing specifically with this problem in relation to highway planting is more meager, especially as regards the actual type of snow profile formed by tree belts of varying width, composition, and density."

The preceding two paragraphs are from a 1940 publication^{1/} "Snowdrift Control on Highways by Planting of Trees and Shrubs" by C. G. Eates and J. H. Stoeckeler. Although this paper was written 44 years ago, it sounds as if it were written today. Needs have a way of repeating themselves. The new interest in planting windbreaks for "Living Snowfences" has us looking at old literature and old plantings to determine the best design.

This technical note reviews past research and includes planning considerations for planting windbreaks as "Living Snowfences."

South Dakota has many miles of windbreaks that were planted to keep snow off the roads. These plantings have shown us which are effective snow traps and which are not. Worthington^{2/} reported several observations after the severe blizzard of 1966. He reported that a three-row windbreak located 180 feet north of an east-west road kept the road clear of snow. One mile north there was a three-row belt located 120 feet from the road. This was too close and the road was blocked. He also stated that good low-level density (a dense shrub row) is necessary to effectively trap snow. Worthington recommended that plantings should be set back 10-20 rods from road right-of-ways.

Bates^{1/} and Stoeckeler reported from wind tunnel studies that there was little to be gained by planting more than three rows of trees or shrubs. They found that one row of caragana stored more snow than a four-foot slatfence. They recommend that for maximum effectiveness, two or more rows should be planted. The spacing that they recommended between the rows was 6 to 10 feet, with a maximum of 12 feet to accommodate the available cultivation equipment.

Planning considerations

The first thing to remember is that all good tree planting practices apply to living snowfences. In some instances, the site where the windbreak should be located will have soil that won't support tree growth. If this is the case,

then slatted fence is the best alternative. In any case, an on-site investigation of the soil should be made.

1. Locations - In trouble areas where snow blockage is commonly a problem, the windward row should be located a minimum of 200 feet from the shoulder of the road.
2. Site preparation - Summer fallow is required if the present cover is grass or there is a noxious weed problem. Current years' cropland can be planted if there is 2-3 feet of soil moisture available.
3. Design - A minimum of two rows planted is recommended. More rows can be added if a higher degree of protection is needed or if wildlife habitat improvement is a secondary objective.
4. Species selection - After the windbreak suitability group is determined, select hardy species that are easy to establish and are not susceptible to rabbit damage. Species such as crabapples and hackberry should be avoided in areas where rabbits are a known problem. Rocky Mountain juniper, eastern redcedar, caragana, silver buffaloberry, Russian olive, Schubert chokecherry, and green ash are examples of species that are hardy, easy to establish, and are not usually damaged by animals.
5. Establishment - It is important that all plants which fail to survive are replaced until a good stand is obtained. Gaps in the planting will allow the snow to go through the belt and form drifts on the road.
6. Fencing - Where livestock will have access to the tree planting, fence will be constructed.
7. Maintenance - Proper care after planting is the key to the success of the living snowfence program. Weeds and grasses must be controlled until there is adequate canopy cover to shade the ground. Do not proceed until a well defined maintenance plan is developed.

Benefits of Living Snowfences

The most obvious benefits that tree and shrub windbreaks have over slatted snowfences are that they are less expensive in the long run and more effective once they are established. In Nebraska, Nickerson^{3/} reports that the cost per mile of slatted snowfence is \$7,114 and the cost of a four-row living snowfence is \$4,180 per mile. Wight,^{4/} North Dakota, reports a cost for slatted snowfence of \$7,207 per mile and a cost of \$3,341 per mile for three rows of trees and shrubs. The costs for the living snowfence in both cases considers a life expectancy of 50 years and includes weed control and fences. Davis^{5/} estimated an annual cost of \$1,368 for slatted fence in South Dakota. Bates^{1/} and Stoeckeler reported that one row of caragana stored more snow than a four foot slatted snowfence.

Some South Dakota counties don't use much slatted snowfence. For these counties the comparison is between the cost of snow plowing and the cost of establishing a living snowfence. Many of the critical snow blocking areas

may be one to five hundred feet long with deep banks.

To start with, have the county highway superintendent select sites that are critical snow blocking areas. From these, select a few sites with good soils for growing trees. These will be the most successful and help sell the idea of planting trees for snow control on highways.

Literature Cited

- 1) Bates, C. G. and J. H. Stoeckeler, Lake States Forest Experiment Station; SNOWDRIFT CONTROL ON HIGHWAYS BY PLANTING OF TREES AND SHRUBS.
- 2) Worthington, E. L., Woodland Conservationist, SCS, Huron, SD, Woodland Technical Note No. 4, Designing Windbreaks for Better Control of Drifting Snow. Sept. 8, 1966.
- 3) Nickerson, D., Nebraska Forest Service, Univ. of Nebraska, Panhandle Station, Scottsbluff, Nebraska; LIVING SNOWFENCE.
- 4) Wight, B., Staff Forester, SCS, Bismarck, ND, Living Snowfence Program.
- 5) Davis, E. W., Maintenance Analyst, SD DOT, Inter-Office Memo, Nov. 29, 1983.



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